Bioscience

Integrating Resource Management

Nutrient and Irrigation Management Plan: 287 Hart Rd Coolup WA, 6214

Prepared on behalf of:
Robert Palermo
May 2023

Nutrient and Irrigation Management Plan
187 Hart Rd Coolup WA

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Introduction

This Nutrient and Irrigation Management Plan (NIMP) was prepared by Bioscience Pty Ltd, as per the guidelines of WQPN 33, on behalf of Robert Palermo of Coolup Investments P/L

Mr Palermo is intending to commence a nursery operation of 287 Hart Rd Coolup as part of an overall plan for the Heritage Listed property, which was formerly known as Brown's Dairy, built in 1951, with a cheese factory built in 1955/6. The intention is to use the site as a tourism attraction containing a café and nursery.

Given that the 1.84 Ha lot is within the Peel-Harvey catchment, a closed circuit irrigation system is proposed to be used to propagate containerised seedlings, then to grow out seedings into larger potted plants. The propagation media used will be composed of composted pine bark, manufactured to conform with AS 3743 – Potting Mixes. Mineral nutrition will be by slow release "Osmocote" fertiliser blended into the mix. Watering will be overhead irrigation in the seedling nursery, and conventional sprinklers with misters in the grow out areas.

1 Summary of the Land Use Proposal

Proponent's name: Mr Robert Palermo
Contact details: 0417 953 149
Site location: 287 Hart Rd Coolup (**Figure 1**)
Project description: The proponent is seeking to commence a small-scale nursery operation of 287 Hart Rd Coolup so supplement income from a tourism venture whereby tourists will visit the historic dairy, have coffee in the café, and have the opportunity to purchase small potted plants. Given that the lot is within the Peel-Harvey catchment, a closed circuit irrigation system is proposed to be used wherein drainage water is captured and reused on site. The site will operate year-round. The total size of the propagation are and the display are will be no more that 450 $m^{2.}$.
Timetable: Operations on site will require about 1 year of development and will continue for 30+ years.

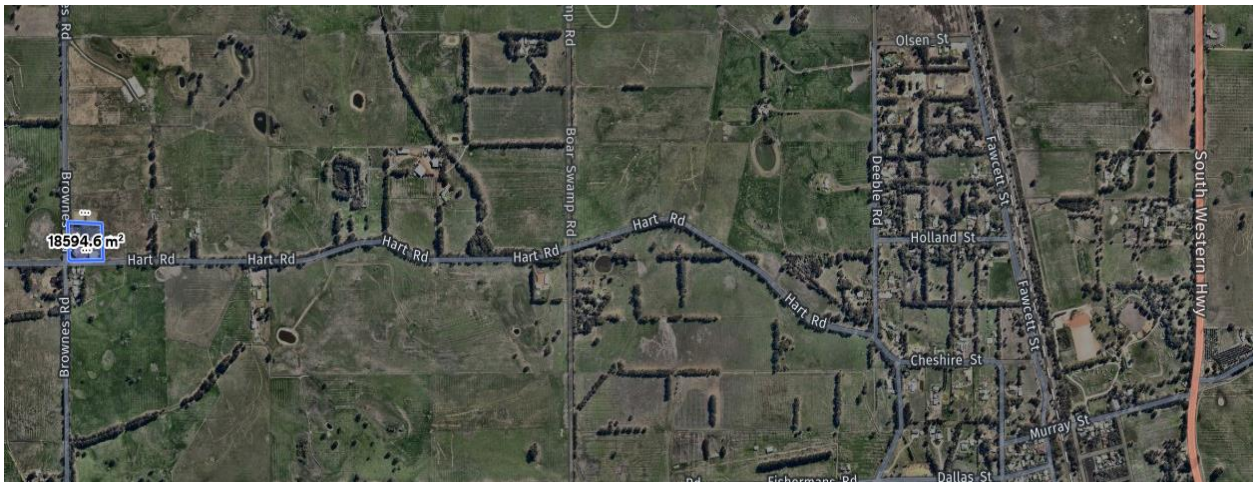

Figure 1. The site is located about 5 km west of the Coolup township.

2 Project Setting

2.1 Zoning

The site is zoned Rural (**Figure 2**) under the Shire of Murray zoning and is surrounded by properties of the same zoning. Under the Shires Town Planning Scheme No.4, a nursery is not directly mentioned in the scheme, however it could be considered to fall under the definition of intensive agriculture, which is classified as AA, Uses which to Council may at is discretion permit provided it is satisfied that such use would not be contrary to the orderly and proper planning of the area, and would thus be subject to Clauses 64 and 67 of the WA State government Planning and Development Act 2005.Regulations.

This proposal is also consistent with the Shire of Murray Local Planning Policy for Horticulture Development (May 2018)

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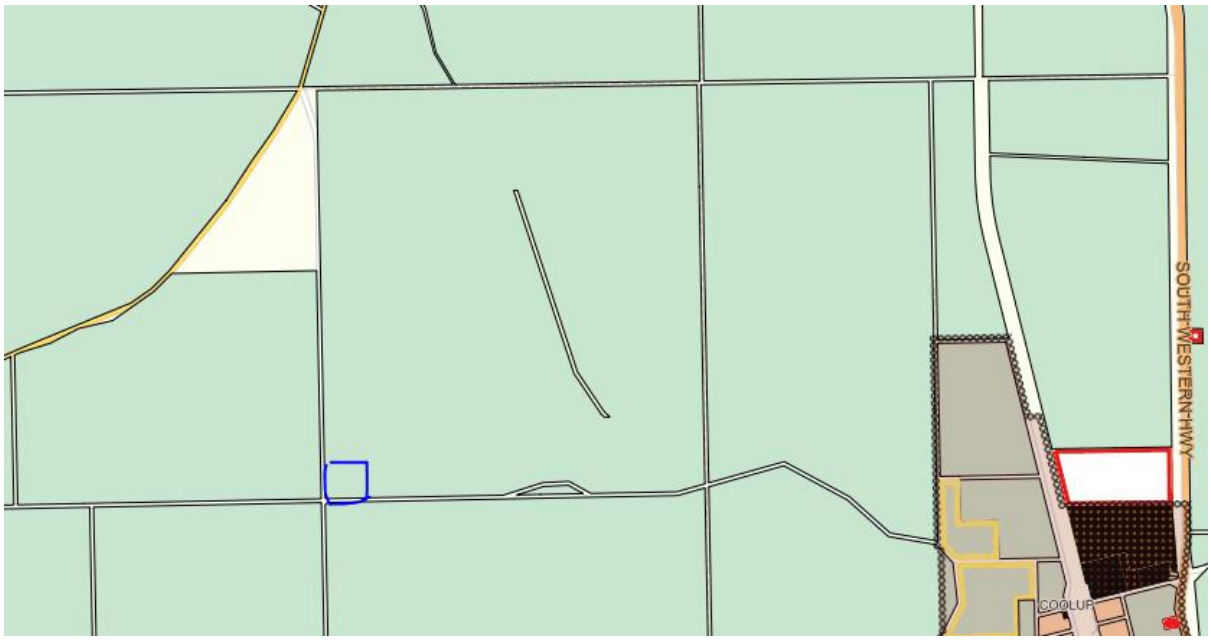

Figure 2 : Rural zoning (green) with site outlined in blue (Source Shire of Murray Intramaps)

2.2 Project Description

2.2.1 Infrastructure and Setback

The site had been run as a commercial dairy, commencing in 1951. The site retains old buildings including a milk receipt and bottling plant, a cheesemaking building containing a shop and offices (to be used as a display area), a boilerhouse (to be used as a propagation area), and a staff toilet and ablution facility .The existing site already contains parking and ablution facilities for the residents, and these will continue to operate as usual.

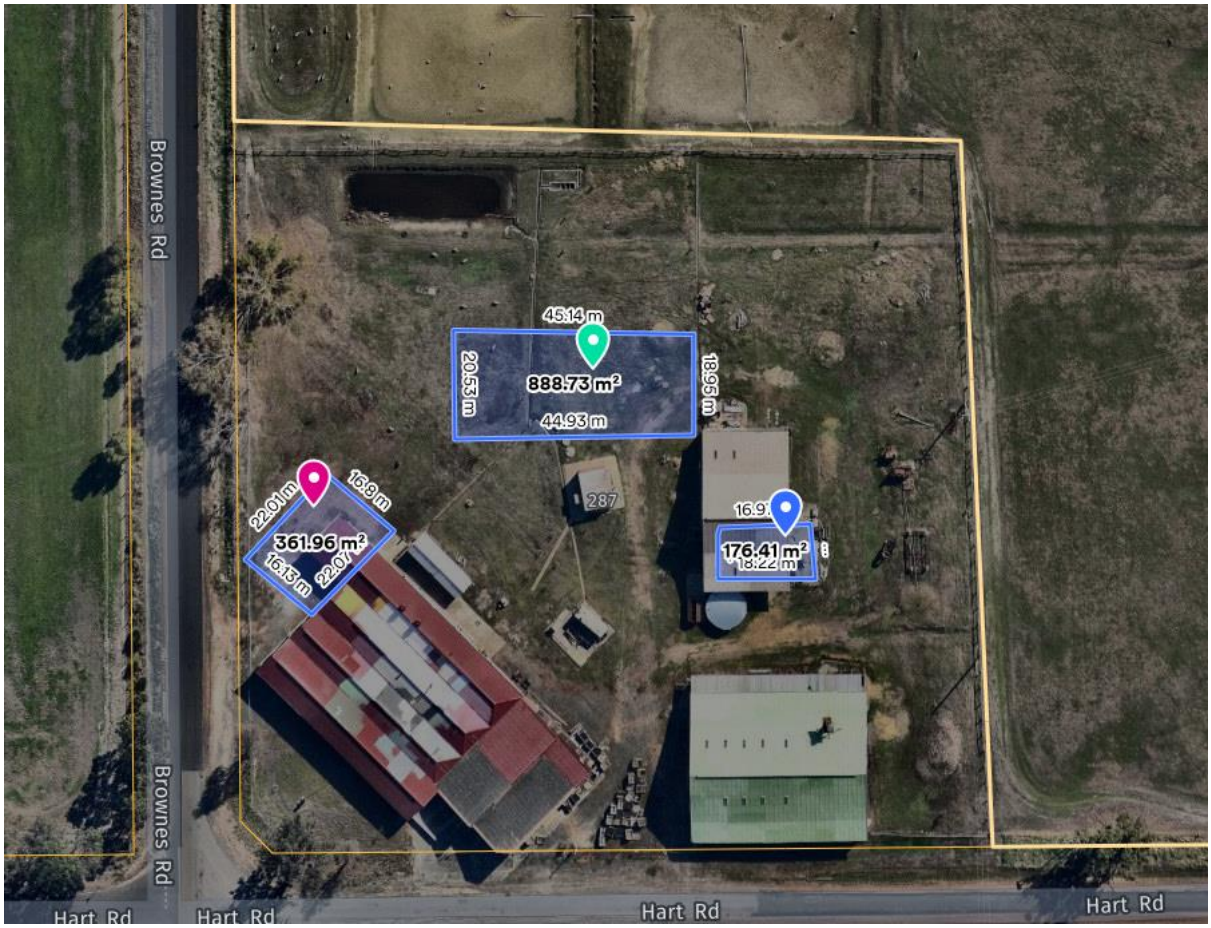

Figure 3. Nearmaps image of site from 18 April 2023 (The red marker is the display area, the blue marker is the production area and the green marker is the olive/pomegranate orchard.

2.2.2 Operating Hours

The site will operate year-round including during the weekdays. During this period, the operating hours will be 7 am to 6 pm.

2.2.3 Staff, Carpark and Vehicle Movements

3 staff will be employed to work on site. Vehicle movement is expected only during the operational hours. The staff will use the existing car park area beside the existing dairy. The Shire of Murray have indicated they are prepared to accept extending this area so that visiting tourists have angle parking with up to 12 visitor bays

2.2.4 Livestock

The site currently has a small flock of Dorper sheep which act as Lawnmowers. Numbers will be reduced according to carrying capacity to 10 head, which will be excluded from the nursery and orchard areas by fencing.

3 Land Use and Nutrient Application Details

The property is located within the catchment of the Peel-Harvey Estuary System. As such, proposals are subject to the following policies:

- State Planning Policy 2.1 (SPP 2.1) Peel Harvey Coastal Plain Catchment (WAPC, 2003).
- Environmental Protection Peel Inlet - Harvey Estuary Policy (EPP) (EPA,1992).

Nutrient targets for proposals within the Peel Harvey Catchment, consistent with the EPP (total phosphorus), and nutrient modelling of the Peel-Harvey catchment (DoW 2011) are as follows:

- Input to land of 6.5 kg total phosphorous/ha/year.
- Input to land of 45 kg total nitrogen/ha/year.

OR

- Export of 0.3 kg total phosphorous/ha/year;
- Export of 2.4 kg total nitrogen/ha/year.

The proposed development considered DWER's advice and will therefore consist of the following:

- Growing media moisture content and levels will be monitored twice daily. The irrigation will be only of sufficient duration to allow for 30% of the applied volume to be drainage runoff.
- The mineral nutrition by N and P will be minimal due to the nature of the species being grown, and the use of slow release fertilisers.
- Drainage water will be onto a hardstand area, already sloped to allow (formerly wash down water from dairy cleaning) to collect into existing drains. Whereas the drains formerly reported to a sedimentation trap before discharge into two dams to the property north of the subdivided lot. These drains will instead report to a sump, from which water will be collected and returned to an irrigation tank.
- This will prevent any water or potentially contaminating nutrient ions from entering groundwater to thus potentially compromise the requirements of SPP2.1.
- It is envisaged that drainage water with complete recirculation will eventually become too saline. Accordingly collected drainage water will be periodically sampled. When the Electrical conductivity exceeds 1 mS/dm, the drainage water will be directed to irrigate relatively salt tolerant trees, being olives trees (already growing) and pomegranates (to be planted.)

The objectives of the aforementioned policies will therefore not be compromised by the proposed development.

4 Local Rainfall, Evaporation and Interception

The climate of the area is characterized by Mediterranean climate comprising cool wet winters and hot dry summers.

Average annual rainfall (Bureau of Meteorology) recorded at Mandurah weather station is 649.3 mm, with most of the rain falling between May and September. **Table 1** shows the monthly average rainfall at Mandurah weather station.

Evaporation is not recorded at Mandurah, but is likely to be similar to the Perth area, which has an annual evaporation of 1716 mm, which is two times more than the annual average rainfall. Monthly evaporation typically exceeds month rainfall between September and April each year.

Table 1: Rainfall and Evaporation at Mandurah Weather Station (Bureau of Meteorology)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Rainfall (mm)	15.9	13.0	16.4	39.3	86.3	116.5	116.4	94.78	61.4	32.5	23.2	14.511.3	649.2
Average Evaporation (mm)	257	218	195	120	78	57	71	102	99	148	189	253	1716

Because of the impervious hard stand area, none of the irrigation water applied to the nursery will report to soil/

5 Soils and Landform Description

5.1 Land Contours

The site is relatively flat at an average height of 20.5 m AHD, with a gentle slope from Hart Rd at 21 m and to the northern boundary at 20 m AHD

5.2 Geology and Soils

The Geoview interactive map, and Geological Survey of WA, Sheets 2032 I, describes the site geology as Opb/Opa a thin veneer of Bassendean sand over Guildford Formation clay with a lens of Opa Guildford Formation Clay to the south east (Figure 4).

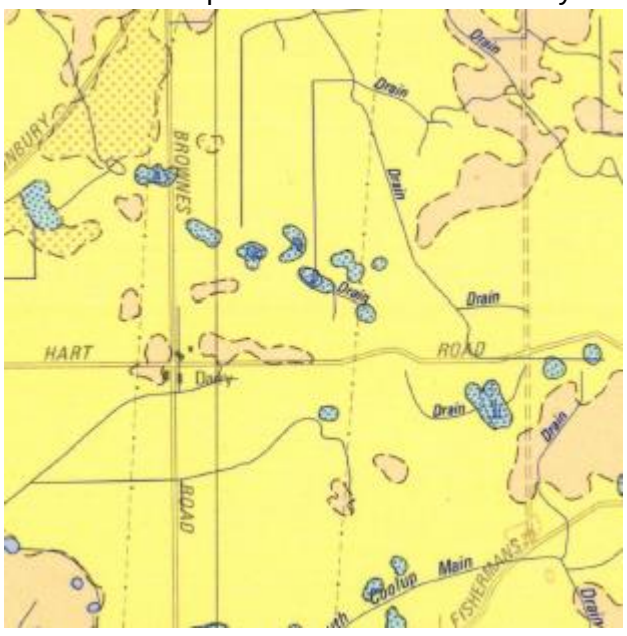

Figure 4 GSWA mapping

According to Peel Harvey Soil Landscape Mapping, the site is mapped as having Pinjarra System soils, with the northern half mapped as P_{1a}, and the south mapped as $P_{1b.}$, thus are considered as low risk of exporting phosphates, and suitable for the proposed use of closed circuit horticulture and growth of perennial orchards. (Figure 6)

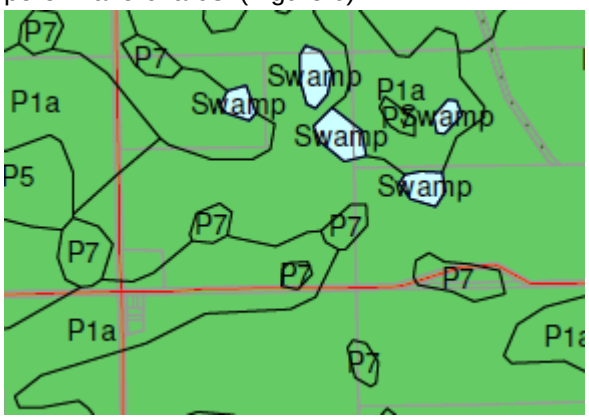

Figure 6 Peel Harvey Soil Landscape Mapping of the site

5.3 PRI

The Phosphate retention Index of Bassendean sand is known to be low (at 0 – 0.5), however the nursery operations will be undertaken on existing hard stand.

5.4 Acid Sulfate Soil

The site is mapped by SLIP as having a moderate Acid Sulphate Soil risk within 3 m of the surface

5.5 Earthwork Details

No earthworks are proposed for the development.

5.6 Imported Soil Amendments

The nursery soil to be used will be exclusively imported soils composed primarily of composted pine bark and conforming to AS 3743 (Potting Mixes). This soil will be exported from the site as sold plants. The soil will be amended with slow release fertilisers.

6 Water Resource Description and Use

6.1 Sensitive Water Resources

6.1.1 Wetlands

The entire site is classified as a Multiple Use Wetland, along with extensive surrounding land. This is not a constraint to the proposed land use.

6.1.2 Groundwater Users

The property has a water licence (CAW 208 339 for 9,285 KL) with two bores in the Perth Superficial aquifer in the Murray Groundwater area, Coolup subarea. The property to the south west has a licenced bore (CAW 64555 for 82000KL in the same aquifer.

6.2 Seasonal or Occasional Flooding / Waterlogging

The site is not mapped on any floodplain mapping.

6.3 Groundwater Description

6.3.1 Aquifer Description

The groundwater in the Superficial aquifer is recharged by direct infiltration of rainfall, with peak groundwater levels occurring between August and October.

6.4 Source of Irrigation Water

The operation will take a water wise approach to sourcing irrigation water. The bore water was analysed and found to be not suitable for a nursery supply, as it contains too much salt (1644 ppm) (Appendix 1) consisting mostly of sodium chloride and calcium sulphate. It is slightly alkaline.

Irrigation water will instead be sourced from rainwater collected from the extensive roof of site existing buildings. Two tanks of 150,000 L and a drainage recirculation tank of 50,000 L will be used.

7 Site Management

7.1 Irrigation Scheme

The site will be watered by overhead sprinklers in the production areas and by a combination of overhead sprinklers and misters in the sales/display area. In is anticipated that the water requirement for the 650m^2 operation (assuming 16,000KL/ha) will be very modest at around 1 million liters per year. As the existing building roofs total 2870 m^2, with the rainfall of around 650 mm p.a. about twice the required irrigation volume will be available from collected rainfwater. Should the area experience very low rainfall, water tanks can be topped up with bore water,

7.1.1 Propagating area

The propagating area will have plant pots in trays held in lined crates watered by overhead sprinklers. The area has an impermeable concrete floor to collect and redirect drainage water from lined crates to the recirculation tank. The drainage water will be blended with rainwater to produce irrigation water of less than 500 ppm

7.1.2 Sales Area

The sales are will be mostly watered by misters, however larger plants may be displayed and irrigated by sprinklers. The display area has a hard surface and drainage from previous land use is directed to a drainage system, thence to dams to the north. An intersecting sump will be installed and drainage will be pumped into a storage tank for re-use after blending with fresh rainwater.

7.1.3 Trees

Collected drainage water that exceed 1 mS/dm will be used to irrigate olives tree currently growing in the central soils north of the proposed development and south of the dams. Further olive trees and pomegranates will be planted into soil improved by the addition of compost to raise PRI.

7.2 Waste Management

7.2.1 Plant Matter

All plant matter produced as a by-product of nursery production will be placed in steel skip bins. When the skip bin is full, it will be transported to a licensed composting facility.

8 Protection of Natural Water Resources

Nutrient-rich water will not be discharged into the natural environment. The natural water resources will therefore be protected from the operation on site.

9 Surface Water and Groundwater Protection

As discussed above, once irrigated by overhead watering and misting, potentially nutrient-rich drainage water will not be discharged into the natural environment. Minimal fertiliser that is within SPP2.1 guidelines will be applied to plants growing in the 650m^2 area for propagation and display. Surface water and groundwater will therefore be protected.

10 Vegetation Management

Native vegetation

Apart from planted street tree on Browns Rd, the site has no native vegetation.

11 Pesticide and Storage Use

The use of pesticides in Australian agriculture is regulated through the Australian Pesticides and Veterinary Medicines Authority. The increasing trend in registration of products is to restrict the use of insecticides, fungicides and fumigants which have half-lives of more than a few days. Environmentally persistent pesticides have been progressively deregistered and removed over the last 20 years. Advanced closed systems, recirculating fertigation in tunnel houses is increasingly using chemical-free systems based on the use of natural predators to control pests, and climatic control to manage fungal diseases.

The proponent uses chemical free integrated pest management (IPM) systems wherever possible. Relative to the open environment, passive and IMP methods are usually sufficient in shade houses. However, if pests and diseases pose significant economic threats, they reserve the right to use chemical pesticides provided and will:

- Follow regulations set by the Australian Pesticides and Veterinary Medicines Authority governing the use, storage, and disposal of pesticides and fungicides and training of applicators and pest control advisors.
- Follow manufacturers' recommendations and label directions.
- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule) and use the minimum amount of chemical needed for the job.
- Do not mix and prepare pesticides within 30m of any well, stream or pond.
- Do not get rid of unused pesticides by washing them down drains.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Clean pavement and sidewalk if chemicals are spilled on these surfaces.
- Only use such pesticides as foliar sprays.

All chemicals will be stored in a locked area in the existing shed of the production area (concrete floor). All applications of chemicals will be entered into a logbook.

All remaining mixtures will be disposed of off-site and according to label instructions. All equipment used for pesticide preparations will be triple rinsed both inside and out to minimize pesticide residues.

References

• *Environmental Protection Peel Inlet - Harvey Estuary Policy (Peel-Harvey EPP)* (EPA,1992); and
• *State Planning Policy 2.1 (SPP 2.1) Peel Harvey Coastal Plain Catchment* (WAPC, 2003).
• *Agriculture Futures: Potential rural land uses on the Palusplain* (DAFWA 2012);
• *Hydrological and nutrient modelling of the Peel-Harvey catchment – Water Science Technical Series Report No WST 33* (DoW, 2011);
• *Horticulture in the Peel-Harvey: A guide for investors and growers* (PHCC, 2015); and
• *Local Planning Policy Horticultural Development (Shire of Murray, 2018).*